It depends on you. Family beliefs of digital technologies as a regulator of children's screen use

Mariona Grané
mgrane@ub.edu
https://orcid.org/0000-0002-1435-0664
University of Barcelona, Spain

Rafael Suárez
rsuarezg@tecnocampus.cat
https://orcid.org/0000-0002-8178-0488
Tecnocampus, Spain

Dorys Sabando
doryssabando@ub.edu
https://orcid.org/0000-0002-9639-7481
University of Barcelona, Spain

Abstract

Family attitudes and beliefs around digital technologies are a key factor in young children's digital habits in the home. This study involved conducting interviews with 46 families of children under 6 years of age to understand how parental perceptions determine the screen use of young children in terms of activities, content, and time. The aim is to provide knowledge for an in-depth reflection on media management in the home.

A descriptive, quantitative study was designed, based on a questionnaire survey model to interview families. The results show few differences between the most positive and the most negative family perceptions of children's use of ICTs. The complexity of the analysis of parental digital education strategies and support systems is evident. The perceptions of families are based on a balance that avoids extremes, are shrouded in contradictions, and are regulated according to the needs of the context. This requires consideration of all the factors that influence children's digital habits: the socioeconomic context of families, parental digital habits, family perceptions, and the parental digital mediation strategies used.

Keywords

Family digital perception, Digital parenting, Children's digital habits

I. Introduction

Screen use by young children (under 6 years old) has increased worldwide since the introduction of tablets in 2013 and their widespread use at home. To date, the study of the elements influencing the use of screens by young children in the home has been analyzed from three regulating factors.

Firstly, the socioeconomic and cultural context is the element that is most often linked to children's use of screens. It is now necessary to analyze how and in what way the sociocultural status of families influences the digital literacy practices of young children in their homes and their learning opportunities (Kumpulainen et al., 2020).

The second modulator (as shown in figure 1) is related to parents' use of technology at a personal and professional level. For Nikken (2017), the use of media by parents' functions as an important predictor of children's media consumption, as well as the time spent on them, and type of devices used and content accessed.

And the least studied third element is the family's perception and beliefs about digital technologies and their influence on children's relationship with screens. Some studies suggest how parents' beliefs towards technology directly affect the quality and quantity of digital media available to children and their use of it at home (Papadakis et al., 2019).

This study focuses on this third regulating factor and aims to analyze how and in what way families' perceptions and beliefs about digital technologies modulate children's use of screens at home. This is done through observing the positive and negative perceptions of technology in the families of a group of children under 6 years old who have been surveyed in the framework of the App2five project. And, parallelly, comparing them with the type of devices and resources that children have at their disposal, the frequency of use of digital devices, and the type of activities they carry out with the media.

a. Regulatory factors in screen use by young children

The way in which these factors have been studied so far involves a reflection on each of their aspects in an attempt to analyze their capacity to influence children's habits in relation to digital and interactive resources, as shown in figure 1.

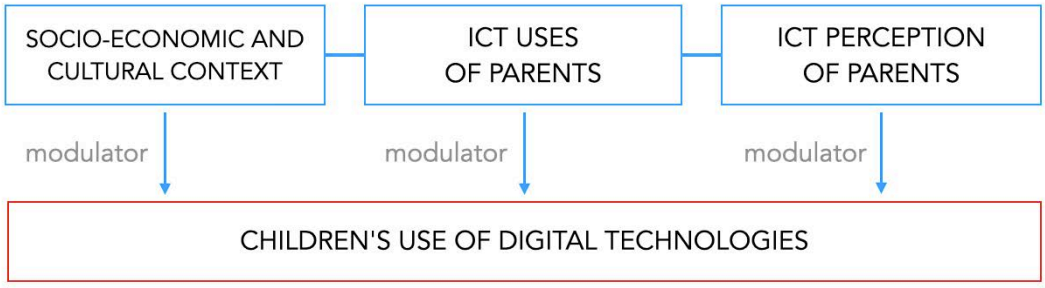

Figure 1. Modulators of children's use of digital technologies, first view.

b. The importance of context

As for the context on the use of screens by children, the results of several studies show a changing trend over time. It has evolved from the conviction that the socioeconomic background determined what children did with the media and family attitudes on orientations and norms of parental digital control (Rideout & Hamel, 2006) to further analysis where differences between families from

different backgrounds are not significant (Cingel & Krcmar, 2013; Connell et al., 2015; Livingstone & Blum-Ross, 2020). But contradictory results are also found in current research, for example, Jiménez-Morales et al. (2020) found that the sociocultural context of mothers affected the type of consumption and screen time of children, and that those from disadvantaged families also received less educational mediation. And, in the same year, the study by Rideout & Robb (2020) found that differences in screen use in terms of economic context and ethnicity have increased enormously, and that children from poorer households spend more time on screens, and attributed this to the fact that nowadays everyone has mobile devices.

Studies such as that of Nikken (2017) have tried to build family profiles that, depending on their context, develop attitudes and beliefs about the use of ICT in the home. But what is most relevant from the studies on context is to understand how the differences lead to a diversity in "media mentoring" Guernsey (2017), that is, in the accompaniment children receive in their use of media. Hence, the current digital divide is not about the possibility of access to interactive and audiovisual resources, but on the educational practices and digital literacy of young children and the learning opportunities that could be offered (Kumpulainen et al., 2020).

c. Family technology habits

More conclusive are the studies on whether parental activities with regard to media, determine children's attitudes. Accordingly, Lauricella et al., (2015) found that the time young children spent on screens was strongly associated with the time spent by their parents. But beyond the time spent on media, the type of digital content consumption has been studied. It is known that children tend to use different types of digital materials depending on the type of content that the family encourages (Piotrowski, 2017), and Chaudron et al. (2015) showed that, although children's skills with technology are limited by their development, they actually learn to use media from observing others, and from the family.

More recently, Pons-Salvador (et al., 2022) reported that more digitally skilled parents have a positive view of the use of the Internet by their children, but at the same time they are those who supervise their children's online activities more closely.

Nevertheless this, parents seem not to be aware that their children reproduce their behaviour, in that they parents simply believe that they are an adequate model of their own habits and preferences (Nikken, 2022).

d. Perceptions of families in modulating children's screen use

This third factor still has a long road of study ahead of it, and in determining how it relates to the other factors. Parents' beliefs about technology directly affect the quality and quantity of digital media available to their children and its use in the home (Papadakis et al., 2019). Family motivations for allowing children to use digital media shape the support that parents offer to their children. Levine et al. (2019) observed that families who perceive the educational value of digital resources tend to accompany and use media together with their children, and on the contrary, those families who do not share this educational vision allow a more autonomous, less controlled and accompanied use.

In their analysis, Mildford and colleagues (2022) considered family perceptions as determinants of children's relationships with screens. They observed a relationship between negative parental perceptions and difficulties with media helping children's development. In fact, the educational potential of mobile devices for children is underused in homes, according to Brito & Dias (2016), the main explanation for this fact being families' perception of digital technologies.

e. One last factor, strategies of digital parenting

These three main elements (context, habits, and family beliefs) act as modulators of the strategies that families develop, and the uses that children make of digital media. However, these *digital parenting* strategies, which are affected by the three factors, become the fourth regulator, as they directly influence the use of technologies for children (Konok et al., 2020; Lauricella & Cingel, 2020; Gruchel et al., 2022; Lee et al., 2022), and, very obviously in the type of content that children consume (Anderson & Hanson, 2017). From the most authoritarian and restrictive strategies (Lee, et al., 2022; Fitzpatrick et al., 2022), to the most permissive ones (Livingstone & Blum-Ross, 2020), and finally to the more educational and effective (Grané, 2021), parental actions do regulate children's use of screens (see figure 2).

These diverse dynamics, as indicated by Brito et al. (2017), are usually determined by parental perceptions and beliefs, which, in turn, are related to family context and parents' digital activities, but not with their knowledge. Mildford (et al., 2022) showed that parents implement several mediation strategies but rarely access guidelines on mobile media use at home with children.

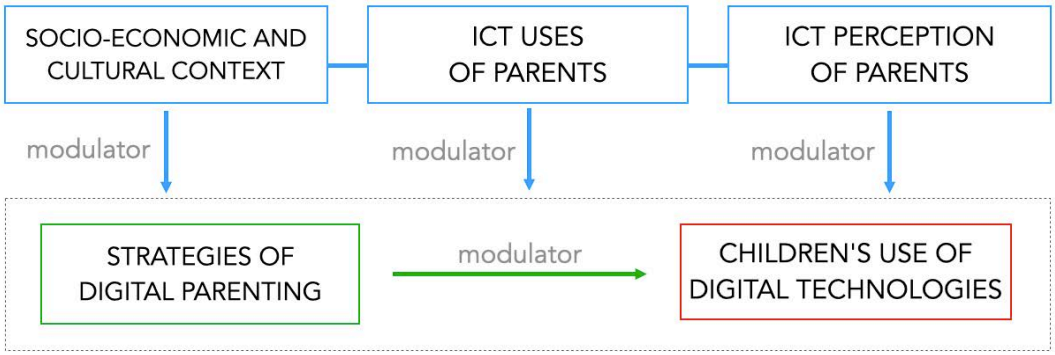

Figure 2. Modulators of children's use of digital technologies, second view.

In the same way that Piotrowski (2017) warned of the need for research to stop treating the context as an adjustment variable and to directly analyze the interconnections between children, the media, and the context. It is necessary to understand that, in these interconnections, family attitudes and habits, and the beliefs of the family have a relevant weight and are interrelated with the context itself. For this reason, it is inevitable that families' perceptions of digital resources for children are studied as a regulating factor of children's digital practices without disconnecting them from the family context and digital habits in the home.

II. Methodology

Based on the interest in determining whether there is a relationship between families' perception of digital technologies and the use of screens in preschool children, a quantitative study was undertaken with a descriptive design (Mateo, 2014) based on a questionnaire survey model (Cea d'Ancona, 2004) to interview the families of the participants. For this purpose, an online questionnaire was created with closed multiple-choice and open-ended questions, and a survey protocol based on a structured interview through which the researchers collected the contributions of 46 families.

a. Research objectives and questions

The results of this article aim to respond to two objectives:

> [1] to analyze whether families' perception of technologies influences the use of screens by preschool children and to identify how this influence is manifested.
>
> [2] to determine whether families' perception of technologies influences different strategies of parental digital mediation and how they are put into practice in the form of actions for accompanying children.

The objectives are specified in the following research questions:

> [R1.1] Do different digital perceptions of families imply differences in the frequency of the use of technology in the home by children under 6 years old?
>
> [R1.2] Do families' digital perceptions influence activities with technologies by children under 6 years old?
>
> [R2.1] Do the different digital perceptions of families lead to differences in parental support for children's use of technology?
>
> [R2.2] Do families' digital perceptions affect the type of parental rules and control when children use technologies?

b. Instrument

The data was collected by means of a targeted online questionnaire designed with the aim of finding out about children's habits, practices, and familiarity with technology, especially with mobile devices.

It was based on a previous questionnaire (Crescenzi-Lanna, 2020) and a systematic literature review was conducted simultaneously (Grant & Booth, 2009) following the phases proposed by Codina (2018). This had the aim of delving deeper into the concepts researched on digital parenting that have analyzed attitudes, uses and family contexts. To this end, a search was carried out in Web of Science and Scopus, Dialnet Plus, TDX and directly in Google Scholar using the following equations in English and Spanish.

- "Digital Parenting" AND "Young Children" OR "preschool Children" OR "toddlers"
- "Screen time" AND "Young Children" OR "preschool Children" OR "toddlers"

Ninety research questions were analyzed that examine the factors that determine children's use of technologies through consideration of the actions and attitudes of the family. Studies from 2013 onwards were selected (with the emergence of tablets on the market) to the beginning of 2021 (when the instrument was designed), and the key inclusion criterion was to question families with children under 6 years old.

From this systematized study, five dimensions of analysis emerged:

- socioeconomic and cultural context,
- family digital habits,
- families' perception of digital technologies,
- digital habits of the participating children,
- and parental digital mediation actions.

To examine the effect of family perceptions of technology on [1] children's use of technology, and [2] the digital education strategies developed in the home, these five dimensions were considered, and a survey instrument composed of 30 questions relating to each dimension of analysis was developed (table 1).

Dimensions	Question Descriptors	Nº of questions
Sociodemographic and contextual data	Child identification, age of the child, siblings, age of siblings, presence of learning difficulties or SEN, identification of parents, level of education of parents, family situation of co-existence, languages spoken at home.	12
Families' digital habits	Internet connection at home, type of devices, frequency of use of technologies by parents, objectives, and activities of parents with digital resources (work, entertainment, information, business, communication, ...).	5
Families' perception about digital technologies	Opinion regarding positive and negative aspects of the use of applications, reasons why they allow and do not allow the use of devices, perception of the influence of devices on their sons and daughters.	5
Digital habits of children at home	Starting age of device use, device ownership, device use frequency, device use goals, and activities.	4
Digital parenting actions	Accompaniment of the child in the use of digital devices, rules of use, person who selects the children's apps, and selection criteria.	4

Table 1. Analysis dimensions

c. Sample

The study involved the participation of 46 families of children aged between 3 and 5 years old, from the levels of preschool 3 and preschool 4 of a public school, located in the town of Cardedeu in the province of Barcelona (Spain), all of them participants in the aforementioned App2five study.

The sociocultural level of the families of the five schools in the town, according to the administrative data of the educational centers, corresponds mostly to a medium socioeconomic and cultural level, with very few families with a low level. According to the studies of the Fundació Bofill (2020) on school segregation in Catalonia (Spain), the schools of Cardedeu have a low level of immigration (5.2%) and one of the lowest levels of school segregation in the region (0.14%).

All the families of young students participating in the App2five project were invited to answer the questionnaire. Out of a total of 53 families, 46 (87%) agreed to participate, and one member of each family (parent) responded to the interview, according to their choice (35 mothers and 11 fathers). They were then previously informed about the objectives of the study, signed the informed consent form and agreed on a time to undertake the survey with the researchers through a guided interview.

d. Instrument validation procedures

The questionnaire was then subjected to procedures to ensure its validity, reliability and objectivity (Hernández et al., 2010), through *validation by a panel of experts* (Torrado, 2014), which included

the participation of three professionals from Spain, Brazil and Argentina, who were selected following the criteria of experience and knowledge in the creation of survey instruments, knowledge of the context by participating as researchers in the App2five project, but were not participants in the design of the survey to families.

In the first phase, the experts reviewed the content and proposed some changes. Later, the corrected version was given to four participating families in a pilot test, which made it possible to control the application time and to corroborate aspects related to the understanding of the questions, assessment of the instrument, and assessment of the response time. The final version of the instrument was used with the 46 families.

e. Data collecting procedures

The questionnaire survey technique (Cea d'Ancona, 2004) was used to collect the data, administered by two researchers via videoconference, in which they conducted the structured survey and filled in the questionnaire, in accordance with the families' responses. This modality was chosen because the respondents needed to visualize some of the data, and, in addition, it allowed the respondents to understand the questions or resolve doubts straight away, thus avoiding erroneous answers due to comprehension issues. However, the limitations proposed by Cea d'Ancona (2004) have been considered in relation to the possible bias in the responses of the respondents, in the presence of the researcher.

The survey lasted an average of 25 minutes per family. Prior to administration, participants were reminded of the objective of the study, the ethical aspects regarding confidentiality, anonymity and use of the results, the importance of giving honest responses and requesting informed consent to participate.

f. Data analysis procedures

The statistical computer software IBM®SPSS 2.0 was used for data analysis. The responses obtained in the questionnaires were subjected to a descriptive analysis. Once the general frequency data was obtained, a contingency table analysis was carried out to differentiate between positive and negative responses in relation to the families' perception of the use of mobile devices, as well as to distinguish the actions of the children in relation to technology, and the strategies of parental mediation. Likewise, a comparative means test was carried out for these independent groups to check the values of statistical significance.

g. Ethical aspects

The ethical aspects considered are based on the Code of Research Integrity of the University of Barcelona (2020) and the Principles for Responsible Research and Innovation, established by the Learning, Media & Social Interactions research group. Both are governed by the guidelines of the European Union (2013). Ethical approval was obtained from the Data Protection Office of the University of Barcelona, and all participants provided their informed consent in writing.

III. Results

The results obtained are presented in relation to the two objectives set out, namely the influence of family perceptions and beliefs on children's digital uses and habits, and their impact on parental digital mediation.

a. Family perception and its influence on children's screen use

The different perceptions of parents have been analyzed by comparing them with two pieces of information; the frequency of children's use of technologies, and the objectives and activities of their use.

Family perceptions and frequency of ICT use by children [R.1.1]

With reference to family perceptions, a generally positive view was observed. Families affirm that some applications are educational (85%), that they entertain children (70%), and are fun for them (63%). In addition, 95% think that technologies help children learn, and 72% agree that they encourage the development of social skills.

However, five families (less than 11%) consider that mobile technologies are not positive. Of these, two do not have or do not allow their children to use them, but the other three families, despite their negative perception, allow their children to use them, even up to five days per week.

If we focus on the responses around the positive perception of technologies (table 2), first of all, we observe how the most common answer about the frequency of use of digital devices (mobile and tablet) is "from time to time" independent of the perceptions and beliefs of the families. But when looking at the data, we see how they are evenly distributed with no notable variations according to perceptions.

		Every day	4-5 days	2-3 days	Weekend	Occasionally	Never	Don't have Do not use
ICTs are fun	Smartphone	6.9	10.3	17.2	17.2	31.0	17.2	0.0
29 responses	Tablet	10.3	3.4	13.8	6.9	27.6	13.8	24.1
ICTs are educational	Smartphone	5.1	7.7	17.9	12.8	33.3	23.1	0.0
39 responses	Tablet	12.8	2.6	10.3	5.1	30.8	10.3	28.2
ICTs calm	Smartphone	8.3	16.7	33.3	8.3	25.0	8.3	0.0
12 responses	Tablet	16.7	8.3	25.0	8.3	25.0	8.3	8.3
ICTs stimulate	Smartphone	10.5	21.1	5.3	5.3	42.1	15.8	0.0
19 responses	Tablet	5.3	5.3	15.8	10.5	36.8	5.3	21.1
ICTs entertain	Smartphone	6.3	9.4	9.4	18.8	34.4	21.9	0.0
32 responses	Tablet	15.6	3.1	9.4	6.3	31.3	9.4	25.0
Children like ICTs	Smartphone	5.6	16.7	5.6	11.1	33.3	27.8	0.0
18 responses	Tablet	16.7	5.6	16.7	11.1	27.8	5.6	16.7

Table 2. Relationship between positive perception of technologies and frequency of use by the child, response in percentages.

It is worth highlighting that those families who consider that apps stimulate children make different use of the smartphone during the week than the families who do not consider it so, as indicated by its statistical significance through chi-square (p=0.02). Similarly, those families who consider that apps calm the children, make different use of both tablets and smartphones from families who do not, as confirmed by chi-square (p=0.01) and the Student's t-test (p=0.05).

Finally, there is also a difference in the use of tablets by the children of families who consider the apps to be positive because they like them (p=0.02) compared to those of families who do not consider this to be a positive element.

On the other hand, habits are also identified from the most negative views (table 3). More than 80% of the participants think that technologies are addictive for children, 46% believe that they are harmful for children under 6 years old, and 93% consider mobile technologies to be a risk for children as they expose them to inappropriate content.

These initial findings already reveal a dilemma for families, who partly see the positive aspects of digital resources for their children, but also foresee the challenges they pose for their children's education.

It is interesting to consider that 9 families out of the 46 surveyed responded that they do not consider them as negative (almost 20%). They somehow do not visualize that they are in themselves negative, and their children continue to use them at the weekend or from time to time.

If we look at the families who do perceive the negative aspects of screens, through considering their negative perceptions and crossing the data with the frequency of use during the week, a set of responses is again produced with little significant relationship that would allow us to distinguish differences between the selected options.

The ideas focused on addiction and the fact that they can be harmful were the most frequently selected options by the participants, but in these and in the rest of the reasons for the negative view, the frequency of screen use remains between 2 or 3 days and occasionally.

This piece of information brings us closer to one of the emerging themes when analyzing parental mediation with technology in the home. And that is time. Concern about the negative aspects of screens is often overcome with time management (Lee et al., 2022). This tends to reassure families, but it is not the only factor that helps improve children's relationship between the media, and as will be seen later, it is not in itself an indicator of a quality relationship between children and screens.

In this case, the Student's t-test only found statistical significance (p=0.03) between the use of tablets by families who consider that apps irritate children and those families who do not consider them to be irritating.

In the same way as when studying the data from the more positive perspectives, here we observe (table 3) that, as the significance data shows, there is no direct relationship between negative perceptions and frequency. Among other reasons, many families give several reasons for their negative view and, at the same time, just as many for their positive view. There is no clear bipolarity between the perceptions, with participants moving between an optimistic, educational, and hopeful vision, and at the same time an approach of doubt and fear about the most harmful factors of the technologies. This leads to results such as those displayed, for example, that those families who consider them to be addictive, also admit that their children use them from time to time (more than 33%), use them 2-3 days a week (almost 20%), and even some every day (5.6%). And if we look at the data for each negative belief, we can see some inconsistency in the amount of time children are exposed to screens.

		Every day	4-5 days	2-3 days	Weekend	Occasionally	Never	Don't have Do not use
Children are too young	Smartphone	0.0	0.0	26.7	20.0	26.7	26.7	0.0
15 responses	Tablet	6.7	6.7	13.3	13.3	26.7	13.3	20.0
ICTs are harmful	Smartphone	0.0	14.3	23.8	14.3	38.1	9.5	0.0
21 responses	Tablet	0,0	4.8	14.3	9.5	33.3	19.0	19.0
ICTs excite children too much	Smartphone	5.9	11.8	23.5	5.9	35.3	17.6	0.0
17 responses	Tablet	11.8	5.9	11.8	5.9	29,4	11.8	23.5
ICTs are addictive	Smartphone	5.6	11.1	19.4	8.3	30.6	25.0	0.0
36 responses	Tablet	13.9	2.8	13.9	2.8	30.6	8.3	27.8
ICTs irritate children	Smartphone	0.0	22.2	22.2	0.0	22.2	33.3	0.0
9 responses	Tablet	22.2	0.0	22.2	11.1	33.3	11.1	0.0
ICTs leave children passive	Smartphone	6,3	12.5	25.0	12.5	25.0	18.8	0.0
16 responses	Tablet	18.8	6.3	6.3	6.3	18.8	18.8	25.0

Table 3. Relationship between negative perception of technologies and the frequency of use by the child, responses in percentages.

Family perception and type of ICT activities by children [R.1.2]

Families were asked about the type of activities their children were engaged in with tablets or smartphones, as well as other technologies (especially Smart TVs).

Although time spent with the media may be a relevant factor, it does not provide a detailed account of a child's media experience (Kumpulainen et al., 2020). Therefore, knowing whether families' perceptions (positive and educational, or negative and worrying) influence the type of media activities children engage in may provide a better understanding of media management in the home.

Among families with a more positive view, there is a significant use of videos, applications, especially educational ones, and video calls (Table 4). For the families interviewed, educational applications are those that contain activities related to curricular content (prereading exercises, maths, vocabulary, etc.). Many of these applications contain the label "educational app", but this has been added by the producers and there is no guarantee of their real usefulness in children's learning processes.

		Videos or films	Games apps	Art apps	Educative apps	Apps to experiment	Digital books	Video calls	Don't use	Don't have
ICTs are fun	Smartphone	5.7	24.1	27.6	34.5	3.4	13.8	48.3	24.1	0.0
29 responses	Tablet	34.5	41.4	31.0	41.4	6.9	20.7	6.9	17.2	24.1
ICTs are educational	Smartphone	48.7	23.1	25.6	30.8	2.6	10.3	46.2	25.6	0.0
39 responses	Tablet	38.5	30.8	28.2	38.5	5.1	15.4	5.1	15.4	25.6
ICTs calm	Smartphone	66.7	33.3	33.3	50.0	8.3	25.0	50.0	8.3	0.0
12 responses	Tablet	58.3	41.7	50.0	58.3	16.7	33.3	0.0	8.3	8.3
ICTs stimulate	Smartphone	47.4	36.8	42.1	47.4	5.3	15.8	63.2	15.8	0.0
19 responses	Tablet	42.1	47.4	36.8	52.6	10.5	21.1	5.3	10.5	21.1
ICTs entertain	Smartphone	56.3	28.1	31.3	34.4	3.1	9.4	43.8	21.9	0.0
32 responses	Tablet	40.6	34.4	31.3	43.8	6.3	18.8	6.3	12.5	25.0
Children like ICTs	Smartphone	44.4	38.9	33.3	33.3	5.6	11.1	50.0	27.8	0.0
18 responses	Tablet	38.9	50.0	44.4	50.0	11.1	27.8	5.6	11.1	16.7

Table 4. Relationship between positive perceptions of technologies and the activities the child carries out with them, responses in percentages.

The purpose of use by families is different in some of the cases depending on their perception, as it has been proven through statistical significance. In several instances, those families who consider the use of apps to be positive for different reasons differ from families who do not.

The use of the media as a system of communication between families and friends, via video conferencing, is a use that has grown exponentially during the pandemic and has continued afterwards, which may explain the trend towards the use of screens with the youngest children. This is one of the activities that more than half of the families carry out, with mobile phones clearly being used, but tablets almost never.

Another activity that all children carry out to a considerable extent, and using either smartphones and tablets, is watching videos or films. We even observe that families who consider that the media calms their children tend to use fewer video games and watch more audio-visuals. This is a trend that is repeated in all the surveys on children's habits with technology. This is because families continue to believe that the use of audio-visual material is less harmful to children than the use of video games, despite the fact studies (Kirkorian & Pempek, 2013) show the contrary.

Along these lines, another relevant fact that we can observe (table 4) is that families who see the media as tools that stimulate children are those whose children use a great variety of applications to play, learn and create, in addition to watching videos.

All the families who that have responded from the positive perspective highlight a high use of what they consider "educational applications," although the applications for experimenting with the media, which are very appropriate for the development of children under 6 years old, are barely used or known at home, and digital books also maintain a low percentage of use.

Finally, very few responses refer to “don’t have” (25%) and “don’t use” (27%), which reaffirms the information on the use of devices by very small children in the home.

In relation to the most negative perspectives on digital resources, table 5 shows the cross-referenced responses with the type of activities children engage in. As with the responses with the more positive perspective, the most common activity is watching videos and films, using two touch devices; and at the same time, in terms of the type of applications, those aimed at experimenting with the media are once again the least used, followed by digital books.

There is no remarkable variation in usage between the different perceptions, however, those families who say that their children are overexcited by screens tend to use more educational apps and video games. In contrast, families who consider them “harmful” use them less, and those who respond that they “irritate” them have a much lower percentage of screen use still.

		Videos or films	Games apps	Art apps	Educative apps	Apps to experiment	Digital books	Video calls	Don’t use	Don’t have
Children are too young	Smartphone	33.3	20.0	6.7	20.0	0.0	20.0	46.7	40.0	0.0
15 answers	Tablet	40.0	46.7	40.0	33.3	6.7	20.0	0.0	13.3	20.0
ICTs are harmful	Smartphone	47.6	23.8	19.0	28.6	0.0	4.8	47.6	23.8	0.0
21 answers	Tablet	33.3	33.3	19.0	23.8	0.0	4.8	0.0	19.0	19.0
ICTs overexcite children too much	Smartphone	41.2	41.2	29.4	35.3	0.0	11.8	41.2	23.5	0.0
17 answers	Tablet	35.3	41.2	23.5	35.3	0.0	11.8	5.9	11.8	23.5
ICTs are addictive	Smartphone	44.4	22.2	25.0	33.3	0.0	8.3	44.4	30.6	0.0
36 answers	Tablet	38.9	33.3	0.0	36.1	2.8	13.9	5.6	13.9	25.0
ICTs irritate children	Smartphone	22.2	22.2	22.2	22.2	0.0	0.0	33.3	44.4	0.0
9 answers	Tablet	44.4	55.6	33.3	44.4	0.0	22.2	0.0	11.1	0.0
ICTs leave children passive	Smartphone	50.0	31.3	18.8	18.8	6.3	12.5	50.0	25.0	0.0
16 answers	Tablet	43.8	43.8	31.3	37.5	6.3	6.3	6.3	25.0	18.8

Table 5. Relationship between the negative perception of technologies and the activities that the child carries out with them, responses in percentages.

Finally, families who consider that screens make children passive are also those whose children watch more audio-visuals, which in themselves are resources that encourage passivity, in contrast to video games, which involve challenges and thus stimulate thinking.

b. Family perceptions and their influence on digital parenting strategies

The second objective is to assess whether the families' perception of technologies influences different parental digital mediation strategies related to the control and accompaniment of children. No significant links were found between the two variables; however, the results are described here as they provide detailed and relevant information on the findings.

Data from the responses concerning family perceptions (positive and negative) were cross-checked with those regarding parental digital mediation systems, considering:

- parental accompaniment while children are using digital resources,
- regulations concerning time,
- and those related to the type of content that children can use at home.

Influence of beliefs on accompanying children during screen use [R2.1]

The aim was to analyze whether there are patterns of accompanying children while they use technologies, according to the more positive and negative perceptions of parents.

The summary table (6) shows, firstly, similar patterns between the two approaches, both in terms of accompaniment and encouraging children's autonomous use.

	POSITIVE PERCEPTION OF TECHNOLOGY				
	Never	Rarely	Sometimes	Frequently	Always
autonomous use	20.1	18.8	14.8	22.1	24.2
accompanied use	2.0	6.0	38.3	27.5	26.2

	NEGATIVE PERCEPTION OF TECHNOLOGY				
	Never	Rarely	Sometimes	Frequently	Always
autonomous use	32.5	17.9	13.8	18.7	17.1
accompanied use	0.8	8.9	33.3	27.6	29.3

Table 6. Positive vs. negative perceptions and autonomous vs. accompanied use of screens, as a percentage.

Parents who speak from a more positive outlook are distributed evenly when asked about the autonomous use of screens by children, but their responses show many different percentages when we ask them about accompaniment. These families clearly respond that their children spend more time with them using screens than alone, with the response "sometimes" being the most prominent, which is a middle ground.

When focusing on the most negative perceptions, a similar trend is found, although the response "They never use ICT alone" is much higher and stands out from the rest of the responses on autonomous use. This can be considered as a coherent response, if parents understand that screens are negative for their children. It is, as can be seen in figure 3, the data that differs from

the overall trend. As for accompanied use from the negative viewpoint, there is no clear differentiation with the positive responses, and it is strongly consistent with the responses assuring that children are generally very much accompanied.

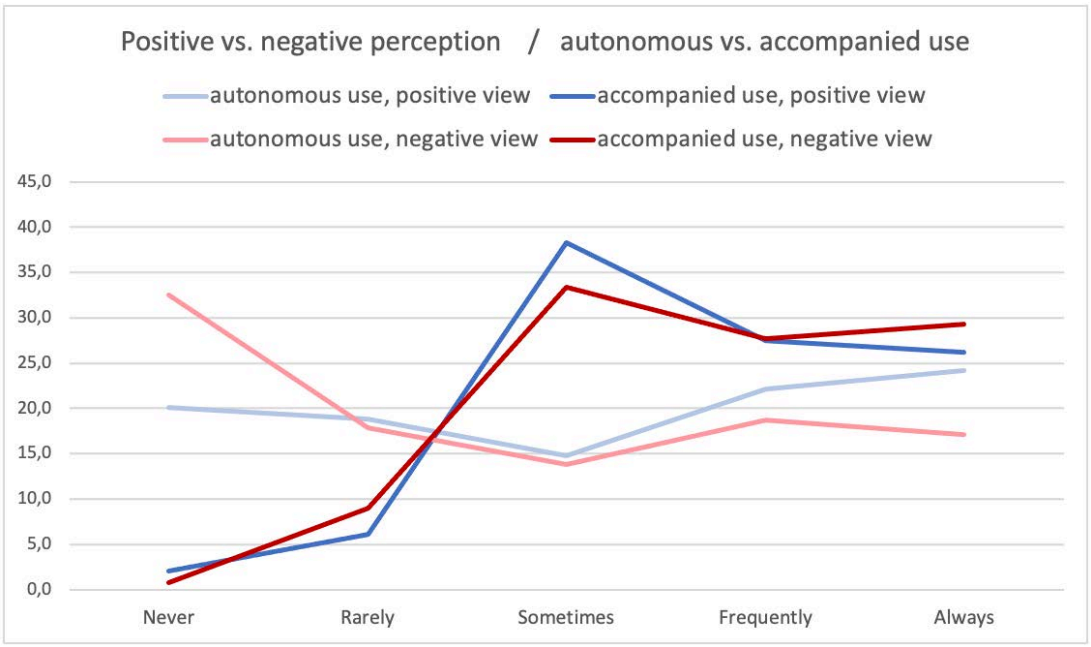

Figure 3. Visualization of responses on the frequency of autonomous and accompanied use considering the most positive and the most negative perspective.

Figure 3, which visualizes the overall responses from the two perspectives, shows the willingness to accompany children, although with a tendency towards the middle option, which is more sporadic, Moreover, considering that the responses can be reversed, (always accompany, never leave alone), the uniformity is underlined regardless of perception.

Relationship between parents' beliefs and rules of ICT use at home.

The other aspect in question is the presence of rules in the home regarding the time of use and content. We again find similar results between the two perceptions (positive and negative, in figure 4). Families state that they have a high degree of control over the time children spend in front of screens and over the content.

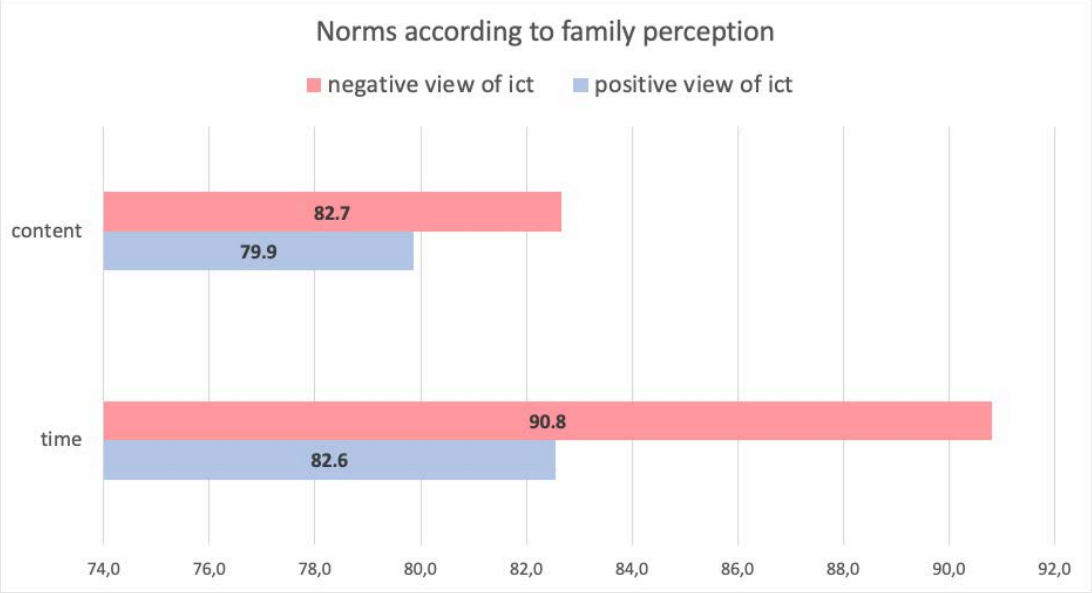

Figure 4. Norms according to perception in percentages.

No statistically significant differences were found between families with a more positive or negative view regarding content norms and those relating to screen time. Although the percentages are lower in those who consider technologies to be more positive, and time continues to be a more controlled factor than content.

IV. Discussion

The responses of families of children under six years old were analyzed in relation to the frequency of children's use of technology, the type of activities they carry out, the rules of parental digital mediation, and adult accompaniment while using technology.

In terms of the frequency of use of technologies by children under 6 years of age, few significant differences were observed between those with a more positive and those with a more negative perception of screens. This fact has also been observed in previous research, with Haddon & Holloway (2018) analyzing the mixed feelings of families who, in principle, give their children digital devices on an ongoing basis, but at the same time, do not feel at ease and have uncertainties about it. It was also noted by Lauricella et al. (2017) who found that this is a fact that has been repeated with the emergence of different technologies.

If we analyze the type of activities, they engage in, one observes a lot of audio-visuals, less gaming, many educational apps (or those labelled "educational"), and there is also no notable difference between those that are most positive and the most adverse to ICT. Despite the fact that studies have repeatedly shown that the use of interactive games and creative tools stimulate and promote learning in children, as distinct to the passive exposure to audio-visuals (Kirkorian & Pempek, 2013; Flewitt, et al., 2014) which does not; families still believe that it is less "harmful" to expose children to audio-visual consumption than to let them use video games or create with the media. For this reason, children's exposure is higher.

These results do not differ from previous research, as Gruchel (et al., 2022) expected parental beliefs and motivations to be positively related to children's educational use of the Internet, but no

statistically significant associations were found between the predictor variables and children's use of the Internet. Velicu (et al., 2019) analyzed families' concerns about technologies in the home and their young children's relationships with them, based on media panic theories. It was observed, once again, that families do not lean towards either a purely negative or a positive view but lean towards a balanced perception. They deduced that most families moderate their concerns on digital technologies in their children's lives, based on their own experiences, needs and daily activities.

Regarding autonomous or accompanied use, even though families with a more positive view tend to accompany children more often, the difference is not significant. Research in this line shows that adult accompaniment is one of the keys to the development of healthy screen habits (Anderson & Hanson, 2017). Being present is not really a positive element in children's education. It is necessary that there is a real, educational accompaniment that promotes dialogue and knowledge of what children do with screens; an active, educational and, at the same time, control strategy is unavoidable (Livingstone & Blum-Ross, 2020; Heller, 2021). The complexity of the analysis of parental digital education strategies and accompanying systems need to be considered in future research.

Finally, when we focus on the systems for controlling screen time and the type of content used by children, it is remarked that families who are more reluctant to use technology tend to control the type of content, but above all, the time spent on screens. This is crucial, as play and learning objectives and activities are key factors in children's developmental processes (Kirkorian et al., 2008; Niken, 2017; Horgan & Kirkorian, 2020). The findings by Fitzpatrick et al. (2022), already showed that restrictive technology behaviors in the home could be beneficial in regulating children's screen time. However, research in the field shows that screen time is not in itself an element that can provide clear information on the responsible use of technologies; what is more important is the type of activities they do during this time with these screens (Grané, 2021). It is increasingly necessary to overcome restrictive regulation and move towards educational and active parent technology strategies.

V. Conclusions

Although the literature indicates that family perceptions of digital technologies are a key factor in children's use of digital technologies (Papadakis et al., 2019), the study of the survey of these 46 families shows no significant differences between more positive and negative views.

Firstly, there is a constant debate between what families consider positive in ICTs (they help learning, they entertain, they amuse, …) and what they see as problematic (they can be harmful, they are addictive, they irritate….). Families face this dilemma on a daily basis and there are no clear stances one way or the other. The study by Sandberg et al. (2021) already showed how the management of digital technology in the home during early childhood is multifaceted and problematic for parents.

This is because families' perceptions may vary according to the needs of the context. Bar Lev (et al., 2018) remarked that parents' everyday boundaries can change their attitudes towards technologies. For instance, despite having doubts about the problems of technologies those who have a need to use them with young children develop a set of positive beliefs towards the media, and so manage to remain consistent with their digital parenting practices.

The study shows that what determines or influences young children's use of technology in the home goes beyond parental perceptions. Families with positive perceptions of technologies do not

show clear differences with families who hold a more negative view, neither in the type of activities they carry out with them, not in the frequency of use, nor in the actions of parental control and management of the media. This should lead us to think that the interrelationship between context-perceptions-ICT habits is diverse and multiple and cannot be understood separately or as disconnected variables. Pila et al. (2021), have already endeavored to study the extent to which parental attitudes towards technologies determine children's digital habits at home; and in the same way as this analysis, they recognize that attitudes alone are not the only ones that affect children's use. Contextual and social factors as well as family habits are also key factors from a shared perspective. Going even further, parental mediation is considered a key strategy in developing children's abilities to use and interpret media, foster positive outcomes, and prevent negative media effects (Amante, 2016).

It is necessary to advance in studies that consider the whole family environment and conditions, as well as parental habits and beliefs towards digital technologies as shown in figure 5.

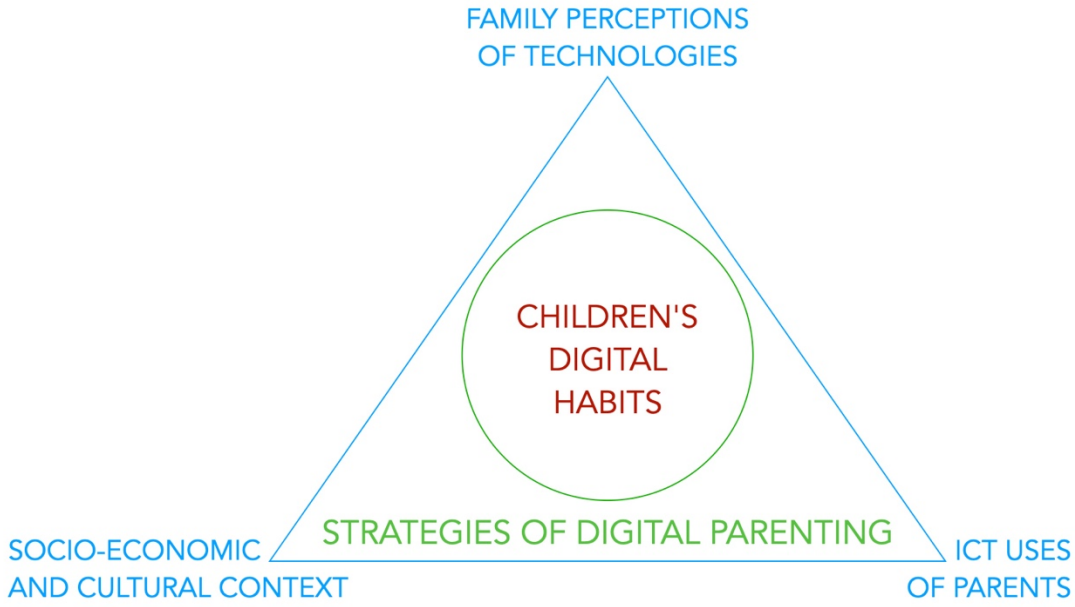

Figure 5. Influences on children's use of digital technologies at home.

The research also showed that qualitative studies with in-depth interviews or family observations are necessary to understand the needs of today's families and their perceptions, habits and educational strategies with children and the media. It is not enough to know whether they accompany their children; it is necessary to know how this accompaniment is carried out. It is not enough to know that content is controlled; it is necessary to know exactly what the content is and what its value is.

The complexity of parental digital mediation requires a deeper understanding of families' media choices, hesitations, and attitudes, in order to develop effective strategies to help parents towards a healthy, responsible and educational digital upbringing.

Acknowledgments

It is necessary to thank all participating families for their time and collaboration with this research. This study is framed within a larger research project entitled 'App2five, redesigning quality educational apps aimed at early childhood'. The project was supported by the Spanish State Program for the Generation of Knowledge and Scientific and Technological Strengthening of the R&D&I System, Subprogram for Generation of Knowledge. And it is funded by the Ministry of Science, Innovation and Universities of Spain, the State Research Agency, and the European Regional Development Fund, as financing entities.

Disclosure Statement:

The authors declare that there are no competing interests to declare or conflict of interest with respect to the publication of this article.

Data availability statement / Data deposition:

All data associated with this article can be found in the University of Barcelona Digital Repository, with access from: http://hdl.handle.net/2445/189804

Supplemental online material:

All information on *App2five* can be accessed from the project website: http://app2five.org

References

Amante, L. (2016). Childhood, digital culture and parental mediation. In: I. Pereira, A. Ramos & J. Marsh (2016). *The digital literacy and multimodal practices of young children: Engaging with emergent research*. (pp. 205-212). Centro de Investigação em Educação (CIEd). Universidade do Minho.

Anderson, D. & Hanson, K. (2017). Screen media and parent–child interactions. In R. Barr & D. Linebarger (Ed.), *Media exposure during infancy and early childhood. The effects of content and context on learning and Development* (pp. 173-194). Springer Nature.

Bar Lev, Y., Elias, N., & Levy, S. (2018). Development of infants' media habits in the age of digital parenting. a longitudinal study of Jonathan, from the age of 6 to 27 months. In G. Mascheroni, C. Ponte, A. Jorge (Eds.), D*igital parenting. The challenges for families in the digital age* (pp. 103-112). Nordicom.

Brito, R. & Dias, P. (2016). La tecnología digital, aprendizaje y educación; prácticas y percepciones de niños menores de 8 años y sus padres. *ENSAYOS, Revista de la Facultad de Educación de Albacete*, *31*(2). http://www.revista.uclm.es/index.php/ensayos

Brito, R., Francisco, R., Dias, P. & Chaudron, S. (2017). Family dynamics in digital homes: The role played by parental mediation in young children's. *Digital Practices Around 14 European Countries. Contemporary Family Therapy*, *39*, 271–280. https://doi.org/10.1007/s10591-017-9431-0

Cea D'Ancona, Mª Á. (2004) *Métodos de encuesta. Teoría y práctica, errores y mejora.* Síntesis.

Cingel, D. & Krcmar, M. (2013). Predicting media use in very young children: The role of demographics and parent attitude. Com*munication Studies*, *64*, 374–394. https://doi.org/10.1080/10510974.2013.770408

Codina, Ll. (2018). *Revisiones bibliográficas sistematizadas: Procedimientos generales y Framework para ciencias humanas y sociale*s. Universitat Pompeu Fabra. https://repositori.upf.edu/bitstream/handle/10230/34497/Codina_revisiones.pdf

Connell, S., Lauricella, A., & Wartella, E. (2015). Parental co-use of media technology with their young children in the USA. *Journal of Children and Media*, *9*(1), 5–21. https://doi.org/10.1080/17482798.2015.997440

Crescenzi-Lanna, L. (2020). Emotions, private speech, involvement and other aspects of young children's interactions with educational apps. *Computers in Human Behavior*, *111,* 106430. https://doi.org/10.1016/j.chb.2020.106430

Chaudron, S., Plowman, L., Beutel, M., Černikova, M., Donoso Navarette, V., Dreier, M. & Wölfling, K. (2015). Young children (0-8) and digital technology. A qualitative exploratory study across seven countries. Publications Office of the European Union.

European Commission (2013). *Ethics for researchers: Facilitating research excellence in FP7*. European Union. https://doi.org/10.2777/7491

Fitzpatrick, C., Almeida, M. L., Harvey, E. Garon-Carrier, G., Berrigan, F. & Asbridge, M. (2022). An examination of bedtime media and excessive screen time by Canadian preschoolers during the COVID-19 pandemic. *BMC Pediatrics, 22*(212). https://doi.org/10.1186/s12887-022-03280-8

Flewitt, R., Kucirkova, R. & Messer, D. (2014). Touching the virtual, touching the real: iPads and enabling literacy for students experiencing disability. *Australian Journal of Language and Literacy, 37*(2), 107–116.

Grané, M. (2021). Mediación digital parental. ¿Es necesaria una educación digital en la primera infancia?. Edutec. *Revista Electrónica de Tecnología Educativa, (76),* 7-21. https://doi.org/10.21556/edutec.2021.76.2037

Grant, M. & Booth, A. (2009). A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal, 26*, 91–108. https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1471-1842.2009.00848.

Gruchel, N., Kurock, R., Bonanati, S. & Buhl, H.M. (2022). Parental involvement and children's internet uses - relationship with parental role construction, self-efficacy, internet skills, and parental instruction. *Computers & Education, 182*. https://doi.org/10.1016/j.compedu.2022.104481

Guernsey, L. (2017). Who's by their side? Questions of context deepen the research on children and media: commentary on chapter 1. In R. Barr & D. Linebarger (Ed.), *Media exposure during infancy and early childhood. The effects of content and context on learning and development* (pp. 25-32). Springer Nature.

Haddon, L. & Holloway, D. (2018). Parental evaluations of young children's touchscreen technologies. En G. Mascheroni, C. Ponte, A. Jorge (Eds.), *Digital parenting. The challenges for families in the digital age.* (p. 113-123). Nordicom.

Hernández, R., Fernández, C., & Baptista, P. (2010). *Fundamentos de metodología de la investigación* (5th ed.). McGraw-Hill Interamericana.

Heller, N.A. (2021). Infant media use: A harm reduction approach. *Infant Behavior and Development, 64*. https://doi.org/10.1016/j.infbeh.2021.101610

Horgan, E.S. & Kirkorian, H.L. (2020). Capacity model and children's comprehension and transfer of educational media. In *The International Encyclopedia of Media Psychology*, J. Bulck (Ed.). https://doi.org/10.1002/9781119011071.iemp0237

Jiménez-Morales, M., Montaña, M., Medina-Bravo, P. (2020). Uso infantil de dispositivos móviles: influencia del nivel socioeducativo materno. *Comunicar*, 64, 21-28. https://doi.org/10.3916/C64-2020-02

Kirkorian, H, Wartella, E. & Anderson, D. (2008). Media and young children`s learning. *The Future of Children Journal, 18*(1), 39-61.

Kirkorian, H.L. & Pempek, T.A. (2013). Toddlers and touch screens: Potential for early learning?. *Zero to Three, 33*(4). https://doi.org/10.1007/s10826-016-0413-x

Kumpulainen, K., Sairanen, H. & Nordström, A. (2020). Young children's digital literacy practices in the sociocultural contexts of their homes. *Journal of Early Childhood Literacy*, 20(3), 472–499. https://doi.org/10.1177/1468798420925116

Konok, V., Bunford,N. & Miklósi, A. (2020). Associations between child mobile use and digital parenting style in hungarian families, *Journal of Children and Media, 14*(1), 91-109. https://doi.org/10.1080/17482798.2019.1684332

Lauricella, A. R., & Cingel, D.P. (2020). Parental influence on youth media use. *Journal of Child and Family Studies 29,*1927–1937. https://doi.org/10.1007/s10826-020-01724-2

Lauricella, A.R., Blackwell, C.K., Wartella, E. (2017). The "New" Technology Environment: The Role of Content and Context on Learning and Development from Mobile Media. In Barr, R. & Linebarger, D.N. *Media Exposure During Infancy and Early Childhood. The Effects of Content and Context on Learning and Development*, p. 1-24. Switzerland. Springer Nature.

Lauricella, A., Wartella, E., & Rideout, V. (2015). Young children's screen time: The complex role of parent and child factors. *Journal of Applied Developmental Psychology*, *36*, 11–17. https://doi.org/10.1016/j.appdev.2014.12.001

Lee, H.E., Kim, J.Y., & Kim, C. (2022). The influence of parent media use, parent attitude on media, and parenting style on children's media use. *Children*, *9*(37). https://doi.org/10.3390/children9010037

Levine, L., Waite, B., Bowman, L., & Kachinsky, K. (2019). Mobile media use by infants and toddlers. *Computers in Human Behavior*, *94*, 92–99. https://doi.org/10.1016/j.chb.2018.12.045

Livingstone, S. & Blum-Ross, A. (2020). *Parenting for a digital future: How hopes and fears about technology shape children's lives.* Oxford University Press.

Mateo, J. (2014). La investigación ex post-facto. In A. Bisquerra (Coord.). *Metodología de la Investigación Educativa* (4th Ed.), (pp. 195-230). La Muralla.

Milford, S.C., Vernon, L., Scott, J.J., Johnson, N. F. (2022). An Initial Investigation into Parental Perceptions Surrounding the Impact of Mobile Media Use on Child Behavior and Executive Functioning. *Human Behavior and Emerging Technologies,* (22), 1-11. https://doi.org/10.1155/2022/1691382

Nikken, P. (2022). The touch-screen generation: Trends in Dutch parents' perceptions of young children's media use from 2012–2018. *Communications, European Journal of Communication Research*. https://doi.org/10.1515/commun-2020-0028

Nikken, P. (2017). Implications of low or high media use among parents for young children's media use. *Cyberpsychology*, *11*(3). https://dx.doi.org/10.5817/CP2017-3-1

Torrado, M. (2014). Estudios de encuesta. In A. Bisquerra (Coord.). *Metodología de la investigación educativa* (4th Ed.), (pp. 230-257). La Muralla.

Papadakis, S., Zaranis, N. & Kalogiannakis, M. (2019). Parental involvement and attitudes towards young greek children's mobile usage. *International Journal of Child-Computer Interaction*, *22*. https://doi.org/10.1016/j.ijcci.2019.100144.

Pila, S., Lauricella, A. R., Piper, A. M., & Wartella, E. (2021). The power of parent attitudes: Examination of parent attitudes toward traditional and emerging technology. *Human Behavior and Emerging Technologies*, 1–12. https://doi.org/10.1002/hbe2.279

Piotrowski, J.T. (2017). The parental mediation context of young children's media use. In R. Barr & D. Linebarger (Ed.). *Media exposure during infancy and early childhood. The effects of content and context on learning and development* (pp. 205-219). Springer Nature.

Pons-Salvador, G., Zubieta-Méndez, X., & Frias-Navarro, D. (2022). Parents' digital competence in guiding and supervising young children's use of the Internet. *European Journal of Communication*, 37(4), 443–459. https://doi.org/10.1177/02673231211072669

Rideout, V., & Robb, M. B. (2020). *The CommonSense census: Media use by kids age zero to eight, 2020*. Common Sense Media.

Sandberg, H., Sjöberg, U., & Sundin, E. (2021). Toddlers' digital media practices and everyday parental struggles: Interactions and meaning-making as digital media are domesticated. *Nordicom Review, 42*(S4), 59–78. https://doi.org/10.2478/nor-2021-004106

Segurola, M. & Cuevas, J. (2020). *Estat i evolució de la segregació escolar a Catalunya. Informe sobre l'estat i l'evolució de la segregació escolar a Catalunya.* Fundación Bofill. https://fundaciobofill.cat/publicacions/informe-estat-i-evolucio-de-la-segregacio-escolar-catalunya

Universitat de Barcelona (2020). *Codi d'integritat en la Recerca de la Universitat de Barcelona*. Vicerectorat de Recerca. http://hdl.handle.net/2445/166917

Velicu, A., Chaudron, S., Dias, P., Brito, R. & Lobe, B. (2019). Parental concerns regarding young children and digital technology: an exploratory qualitative investigation in three European countries. *Revista româna de sociologie, 30*(4).

Depèn de tu. Les creences familiars sobre les tecnologies digitals com a reguladores de l'ús de pantalles per part dels infants.

Resum

Les actituds i creences familiars sobre tecnologies digitals són un factor determinant en l'ús que en fan els nens petits a la llar. Aquest estudi ha dut a terme entrevistes amb 46 famílies de nens i nenes menors de 6 anys per comprendre com les percepcions parentals determinen les activitats, continguts i temps dels més petits davant de les pantalles. L'objectiu és aportar coneixement per a una reflexió profunda sobre la gestió dels mitjans a casa.

Es va dissenyar un estudi quantitatiu descriptiu, basat en un model d'enquesta per qüestionari per entrevistar les famílies. Els resultats mostren poques diferències entre les visions familiars més positives i les més negatives sobre lús que fan els nens de les TIC. S'evidencia la complexitat de l'anàlisi dels sistemes d'acompanyament i estratègies d'educació digital parental. Les percepcions de les famílies es mouen cap a un equilibri que evita els extrems, s'embolcallen amb contradiccions i es regulen en atenció a les necessitats del context. Això fa que calgui la consideració global dels diferents factors que influeixen en els hàbits digitals infantils per a comprendre les relacions dels petits amb el mitjà.

Paraules clau

Percepció digital familiar; Criança Digital; Hàbits digitals dels infants

Depende de ti. Las creencias familiares sobre las tecnologías digitales como reguladoras del uso de pantallas por parte de los niños

Resumen

Las actitudes y creencias familiares sobre tecnologías digitales son un factor determinante en el uso que hacen de las mismas los niños pequeños en el hogar. Este estudio ha llevado a cabo entrevistas con 46 familias de niños y niñas menores de 6 años para comprender como las percepciones parentales determinan las actividades, contenidos y tiempos de los más pequeños ante las pantallas. El objetivo es aportar conocimiento para una reflexión profunda sobre la gestión de los medios en el hogar.

Se diseñó un estudio cuantitativo descriptivo, basado en un modelo de encuesta por cuestionario para entrevistar a las familias. Los resultados muestran pocas diferencias entre las visiones familiares más positivas y las más negativas sobre el uso que hacen los niños de las TIC. Se evidencia la complejidad del análisis de los sistemas de acompañamiento y estrategias de educación digital parental. Las percepciones de las familias se mueven hacia un equilibrio que evita los extremos, se envuelven de contradicciones, y se regulan en atención a las necesidades del contexto. Lo que precisa considerar todos los factores que influyen en los hábitos digitales infantiles: el contexto socio económico de las familias, los hábitos digitales parentales, las percepciones familiares, y las estrategias de mediación digital parental usadas.

Palabras clave

Percepción digital familiar; Crianza Digital; Hábitos digitales de los niños.

Date of publication: 30/06/2023